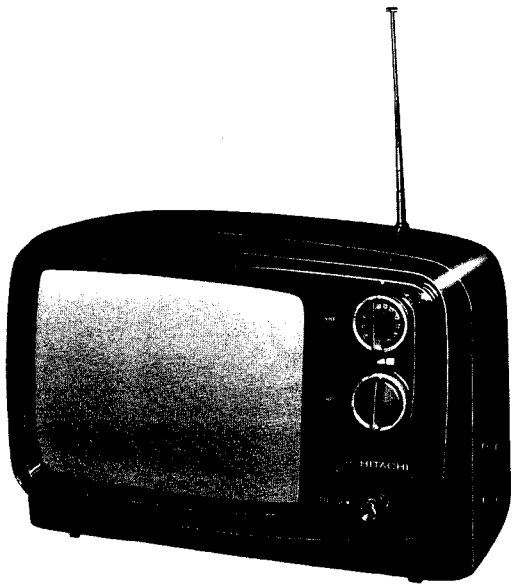
HITACHI

I-28

SERVICE MANUAL No.234 SX Chassis



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SPECIFICATION

FREQUENCY RANGE	
VHF Channels	54MHz ~ 88MHz
	174MHz ~ 216MHz
UHF Channels	470MHz ~ 890MHz
INTERMEDIATE FREQUENCIES	
Picture I.F. Carrier	45.75MHz
Sound I.F. Carrier	41.25MHz
POWER INPUT	AC 120V 60Hz
	DC 12V Battery, Car battery
POWER RATING	DC 12W
	AC 25W
AUDIO POWER OUTPUT	0.5W
VIDEO RESPONSE	3.0MHz
SWEEP DEFLECTION	Magnetic
FOCUS	Electrostatic
ANTENNA INPUT IMPEDANCE	VHF 300ΩBalanced
	UHF 300ΩBalanced
PICTURE TUBE	9AGP4
TRANSISTOR	7
IC	6
DIODES	11
CABINET DIMENSIONS	11-15/16"(W) x8-3/8"(H) x9-5/8"(D)
WEIGHT	11 lbs

IC • TRANSISTOR

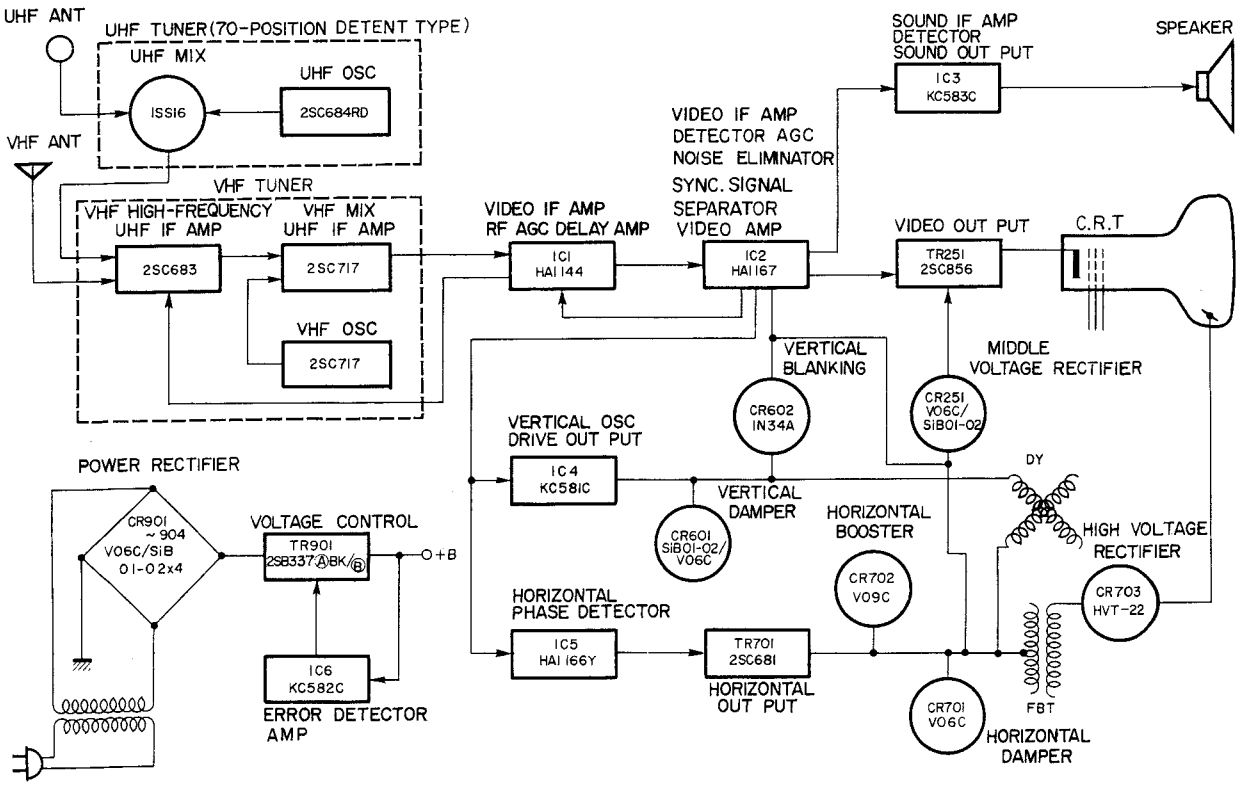
SAFETY PRECAUTIONS

WARNING: Since the chassis of this receiver is connected to one side of the Mains Supply during operation, service should not be attempted by anyone unfamiliar with the precautions necessary when working on this type of equipment.

The following precautions should be observed:

1. Do not install, remove, or handle the picture tube in any manner unless shatter-proof goggles are worn. People not so equipped should be kept away while picture tubes are handled. Keep picture tube away from the body while handling.
2. When service is required, an isolation transformer should be inserted between power line and the receiver before any service is performed on a "HOT" chassis receiver.
3. When replacing a chassis in the cabinet, always replace all the protective devices are put back in place, such as; barriers, non-metallic knobs, adjustment and compartment cover or shields, isolation resistor-capacitor, etc.
4. When service is required, observe the original lead dress. Extra precaution should be taken to assure correct lead dress in the high voltage circuitry area.
5. Always use the manufacturer's replacement component. Especially critical components as indicated on the circuit diagram should not be replaced by other makes.
   Furthermore where a short circuit has occurred, replace those components that indicate evidence of overheating.
6. Before returning a serviced receiver to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the instrument by the manufacturer has become defective, or inadvertenly defeated during servicing.
   Therefore, the following checks are recommended for the continued protection of the customer and service technician.

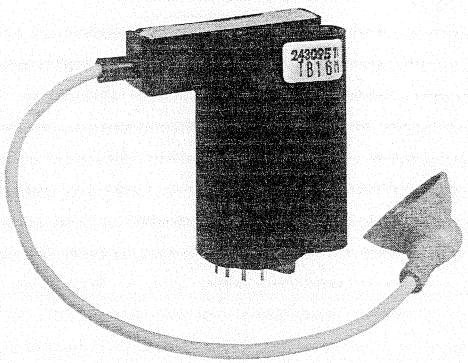
BLOCK DIAGRAM



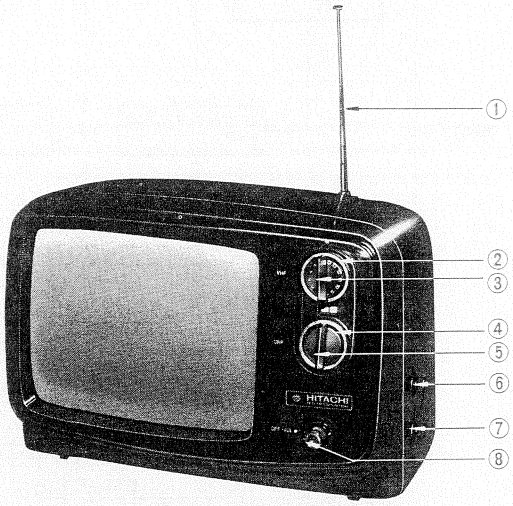
INTRODUCTION OF NEW PRODUCT

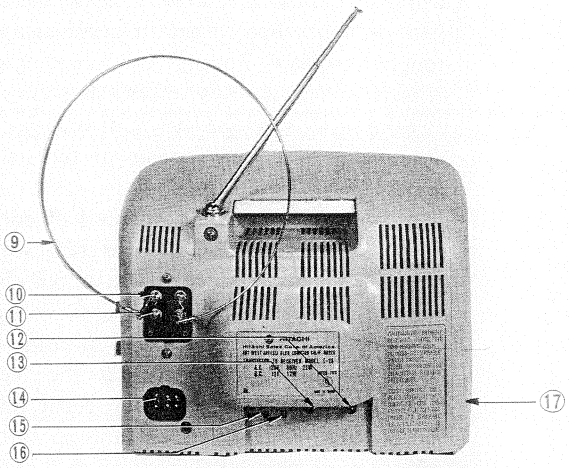
FLYBACK TRANSFORMER

The flyback transformer, constructed with all nonflammable materials, is designed as one unit with a high-voltage rectifying diode; consequently, high reliability is obtained. Moreover, it has become small scaled by eliminating the terminal board.



CONTROLS





1. TELESCOPIC ANTENNA
2. VHF PRE-SET FINE TUNING
3. VHF CHANNEL SELECTOR
4. UHF FINE TUNING
5. UHF CHANNEL SELECTOR
6. CONTRAST
7. BRIGHTNESS
8. ON-OFF SWITCH, VOLUME CONTROL
9. LOOP ANTENNA
10. UHF ANTENNA TERMINAL
11. VHF ANTENNA TERMINAL
12. H. HOLD
13. V. HOLD
14. POWER
15. V. LINEARITY CONTROL
16. V. SIZE CONTROL
17. EARPHONE JACK

DESCRIPTION OF CIRCUIT

1. POWER SOURCE CIRCUIT

① Instantaneous starting circuit

Fig. 1 indicates the preheat circuit; relations between the preheat power and the starting time are shown in Fig. 2.

When inserting the power source socket in a receptacle, Preheat power is supplied to the heater through R901, When endeavoring to receive television images, if switches S901 and 902 (interlocked) are thrown ON, the heater is connected to the regulator output, rated heater power (12V, 75mA) is supplied, and the normal voice and picture are obtained in the short time of within one second. Power consumption during preheating time is approximately 2W. It has been confirmed that there is absolutely no bad influence on the picture tube durability even though it is preheated continuously while the TV set is not in use. (Durability test completed).

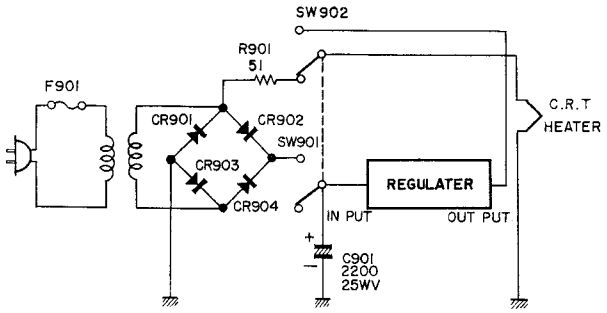


Fig. 1

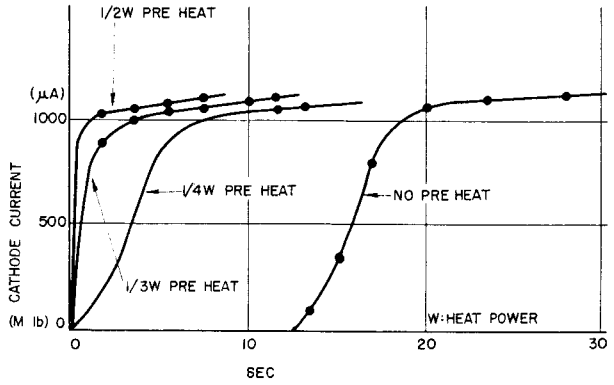


Fig. 2

② Constant voltage power source circuit

Ordinarily, composition of the constant voltage stabilized power source circuit is as shown in Fig. 3.

Should output voltage (Vo) fluctuate due to one cause or another, the fluctuation of that output voltage is compared with the standard voltage through an error detection amplifier, it is amplified, and an error signal is transmitted to the control section. In the control section, according to an error signal, the output voltage (Vo) is controlled so that it becomes a previously set constant voltage. Through the foregoing operation, the output voltage is always maintained constant regardless of fluctuations in load and input voltage.

The constant voltage circuit of this television set is shown in Fig. 4.

The control section is composed of constant voltage control transistor TR901 and IC6 which has dual capacity of error detection and amplification. R903 is a variable resistor for adjusting +B voltage. The input voltage (Vi) of this circuit is a pulsating voltage which is rectified and smoothed by the rectifier diodes (CR901~CR904) and the filter capacitor (C901), and the voltage is stabilized in this circuit to constant voltage of complete DC.

In general, when the input voltage (Vi) lowers under a certain voltage value, the constant voltage circuit cannot perform constant voltage operation. In such a case, to eliminate fluctuations of load and input voltage from arising in the output voltage (Vo), an active filter function is added to this television set. Through an inner circuit consisting of R902, C902, and IC6, an active filter circuit is composed. Consequently, this televison set can perform stabilized operation for lowered AC power source voltage and lowered battery terminal voltage. The terminal ④ of IC6 is connected to one end of P901, changing the active filter circuit operation to either the AC side or the DC side.

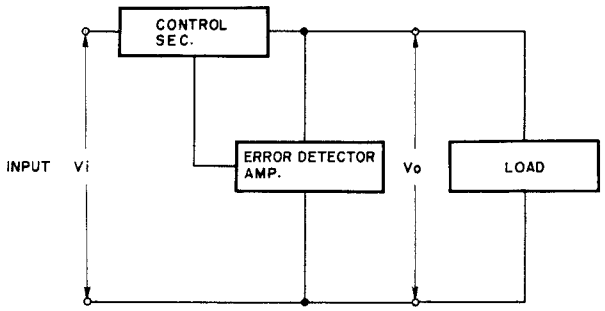


Fig. 3

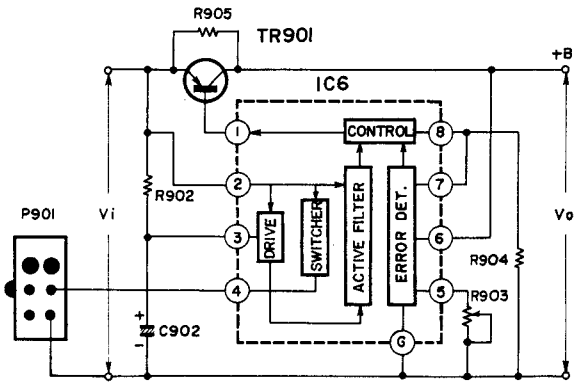


Fig. 4

2. VIF AMPLIFIER AND DETECTOR CIRCUIT (PIF CIRCUIT)

In the PIF circuit, monolithic IC s (HA1144, HA1167) are adopted. PIF output of the tuner is amplified two stages with HA1144, further, it is amplified one stage with the third PIF of HA 1167. Detection of PIF, which is amplified up to the necessary level, is effected by HA1167. Functions of HA1144 are PIF gain control, RF AGC, delay changing, RF forward AGC amplifying, and RF reverse AGC amplifying in addition to PIF amplifying. Adjustment of RF AGC delay changing is effected from the outer side through R209. Output of RF reverse AGC amplifying is not used because the tuner is the AGC type.

The PIF filter circuit is composed of a capacity coupling, double-tuned circuit which is formed by the tuner output section and the PIF input section, output single tuned circuit (T201 in Fig. 5) of HA1144, and the third PIF output single tuned circuit (L207 in Fig. 5) of HA1167, indicating the pass band characteristic which has a total of four stages. Regarding the self-sound carrier wave (41.25 MHz), lower adjacent channel sound carrier wave (47.25 MHz), and upper adjacent channel picture carrier wave (39.75 MHz), a necessary attenuation factor is obtained by inserting a trap circuit in the PIF input section.

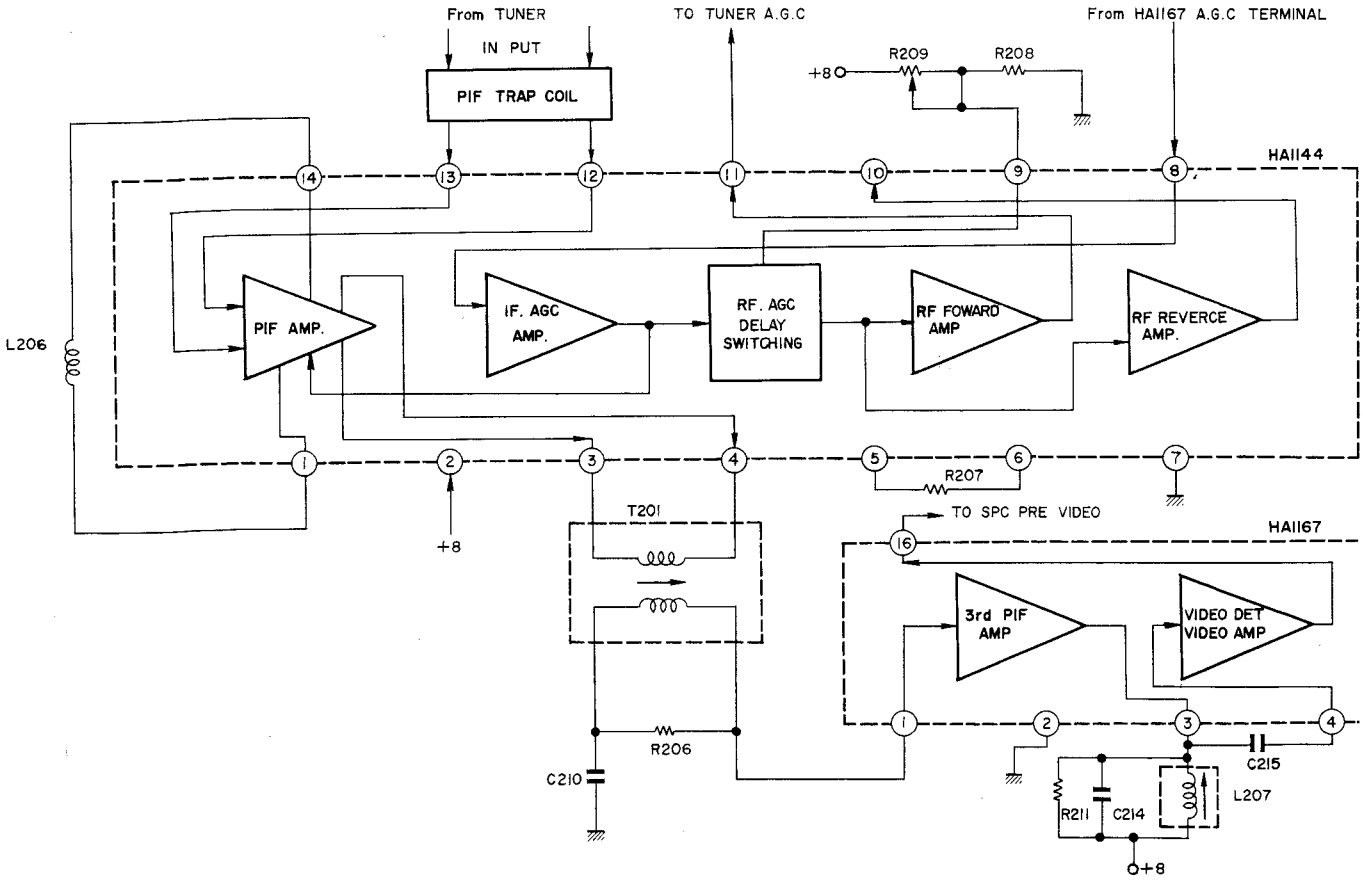


Fig. 5

3. VIDEO AMPLIFIER CIRCUIT

Video amplifier is constructed previdео amplifier and video output circuit in ic HA1167.
Previdео output circuit incorprated with blanking circuit, this blanking circuit is different between former chassis and SX chassis.

4. SIGNAL PROCESSING CIRCUIT (SPC CIRCUIT)

IC HA1167 is adopted in this circuit.
Circuit organization of this IC is shown in Fig. 6.
The signal processing circuit is connected to the AGC circuit and the synchronous detached circuit through the noise eliminator circuit.
The AGC circuit is a peak value type AGC, the same as a conventional chassis (SV, SW and so on). In HA1167, up to an AGC filter circuit section is incorporated, and switching of IF AGC and RF AGC is included in HA1144. Different from conventional chassis, the synchronous detached circuit adopts an emitter time constant type.

Moreover, from HA1167, sound signals are also separated from terminal (16). Terminal (16) is the emitter follower output becoming low output impedance, sufficiently operating the sound circuit, picture circuit, and synchronous detached circuit.
Sound trap coil connect to terminal (16) which resonate with 4.5 MHz. The sound signal of 4.5 MHz is obtained from the secondary side of the SIF input transformer, and the picture signal from which the sound signal is eliminated is obtained from the output side of the trap.

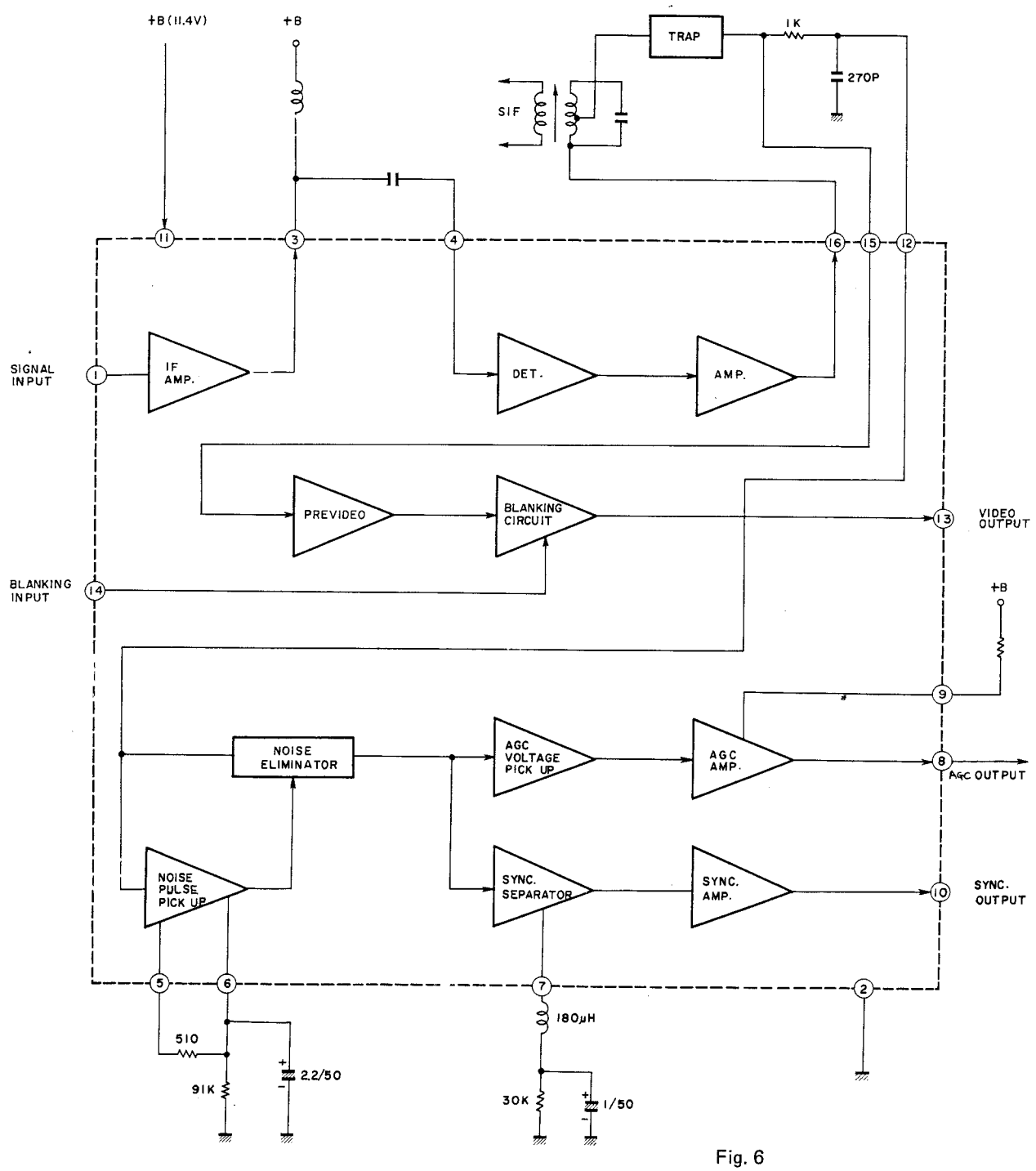


Fig. 6

5. AUDIO CIRCUIT

A monolithic IC—IC3(KC583C) – is adopted in the audio circuit. IC3 (KC583C) has the functions of an SIF amplifier circuit, detection circuit, and audio-frequency amplifier circuit.

The audio circuit is indicated in Fig. 7. The SIF amplifier circuit incorporates the differential amplifier; it operates as an amplitude limiter to suppress the AM component together with amplifying the second sound intermediate frequency signal generated in the picture detection circuit.

The detection circuit has a modified composition of the ratio detection circuit; it operates as FM detection for the amplified second sound intermediate frequency signal. Detected signals enter the low-frequency amplifier circuit through the buffer amplifier. The audio-frequency amplifier circuit consists of a audio drive stage and a audio output stage of the quasi-complementary SEPP OTL circuit; it amplifies detected small sound signals to sufficiently large signals which can drive a speaker.

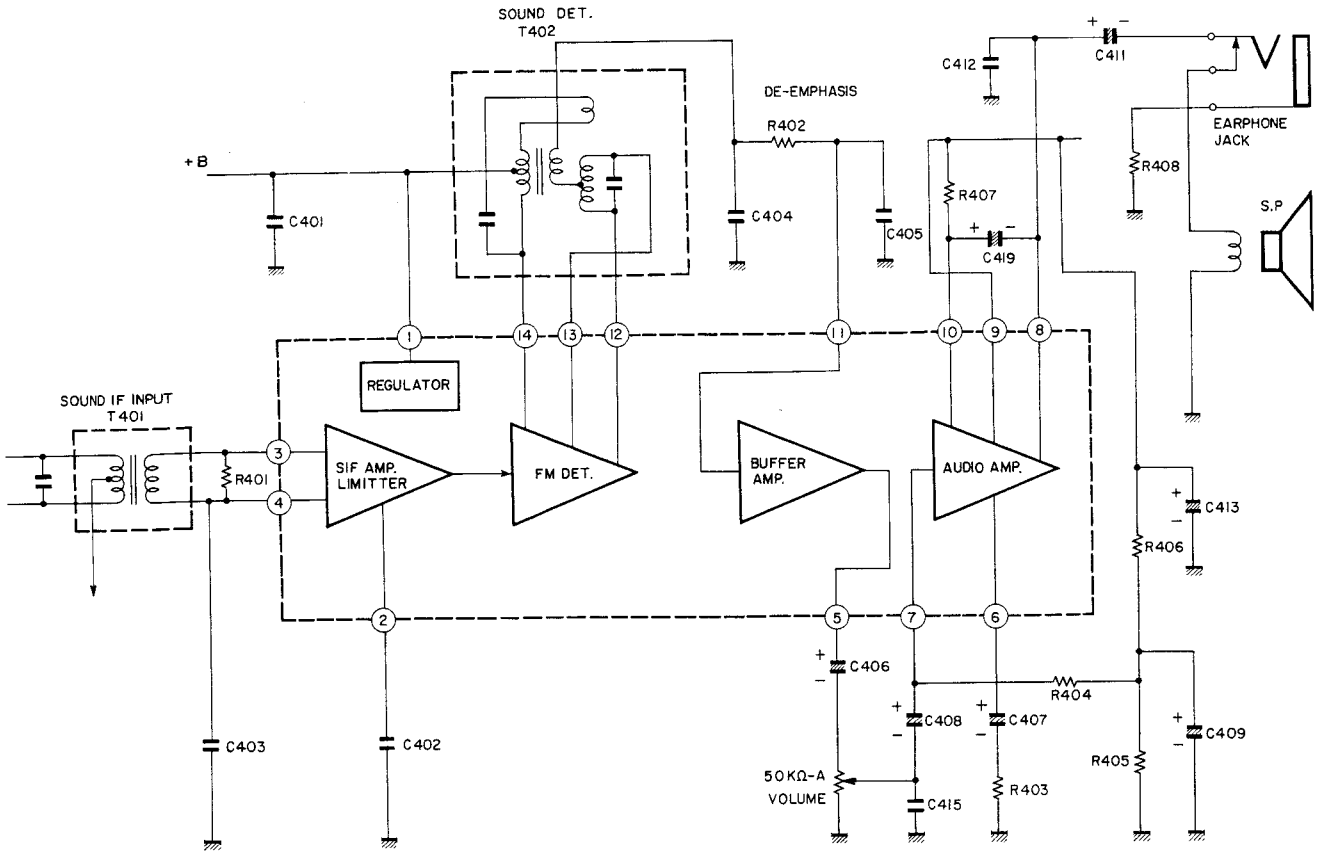


Fig. 7

6. VERTICAL DEFLECTION CIRCUIT

The vertical deflection circuit incorporates an oscillating circuit which oscillates synchronized with a vertical synchronizing signal and an output amplifier circuit, supplying a sawtooth wave form current to the deflecting yoke after amplifying the oscillating output voltage of a sawtooth type. However, in this chassis, these operations are performed with one IC (KC581C).

(Circuit operation)

In Fig. 8, a synchronizing signal is impressed from terminal A, and the vertical synchronizing signal components which is separated by the intergrating circuit is impressed from terminal ②.

This signal is amplified by the synchronizing amplifier circuit in the IC, and is then impressed on the oscillating circuit.

The oscillating circuit is a RC oscillating circuit which oscillates according to the time constant determined by C605, R603, and R604. Synchronization is obtained from output of the synchronizing amplifer. Output of the oscillator is a pulse comes out in terminal ⑪, and a sawtooth-type wave form is made by C606 and R605. This sawtooth-type wave performs correction of size linearity in the wave form shaping circuit, and is then impressed on the output amplifier circuit from terminal ⑬.

The output amplifier circuit is a Class B OTL current, voltage feedback amplifier circuit which already has been proven on the SV chassis. The output signal is obtained in terminal ⑨, supplying a sawtooth-type wave form current to the deflecting yoke.

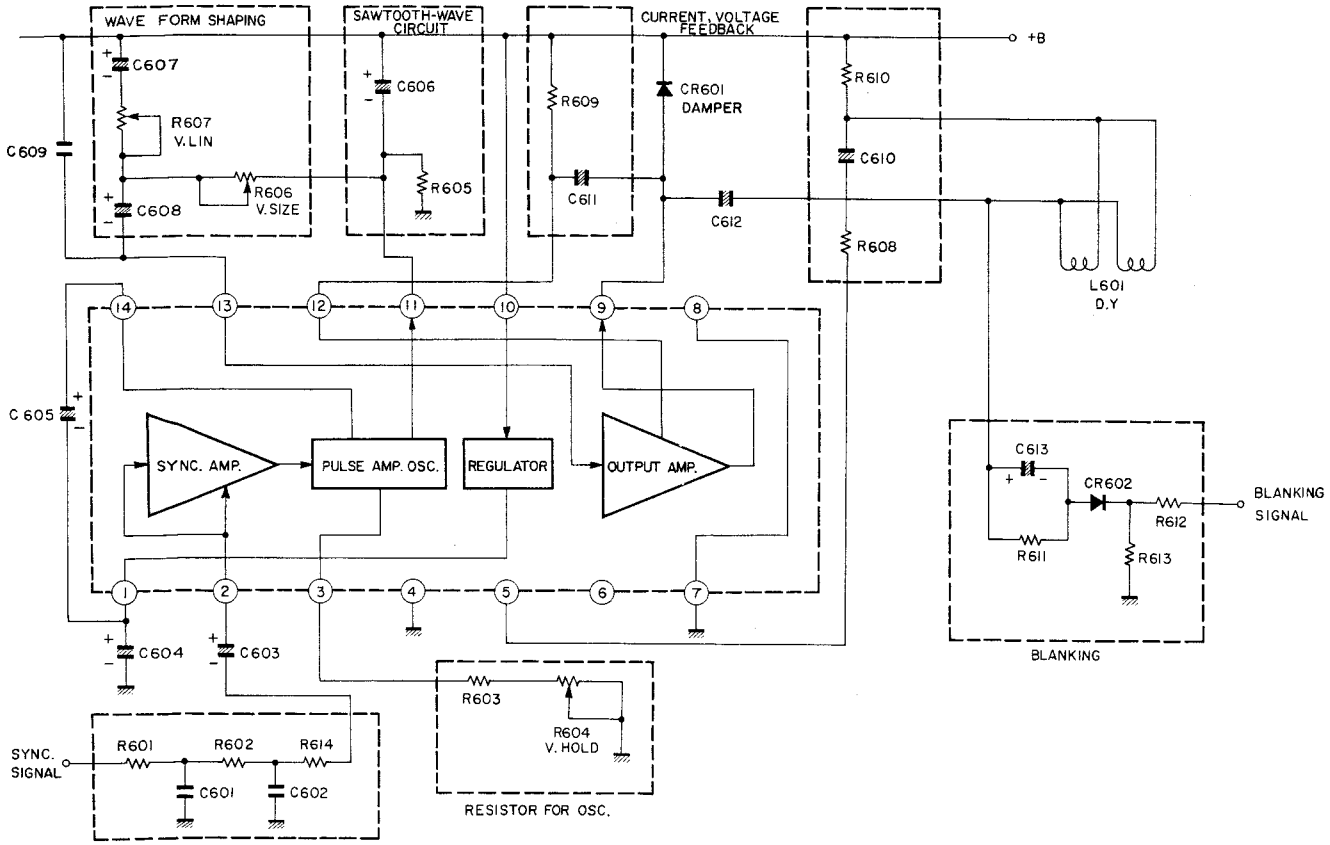


Fig. 8

7. HORIZONTAL DEFLECTION CIRCUIT

① Horizontal APC, oscillation and drive circuit.

This circuit adopts a newly developed IC (HA1166Y).

This IC integrates the functions of phase detection, filter circuit, oscillation, and drive. Thanks to the IC in which many active elements all included, picture stabilization, the responce characteristic, and reliability are greatly enhanced.

(Circuit operation)

A block diagram is indicated in Fig. 9. Similar to conventional horizontal circuit functions, the comparison wave enters from ⑨, and the synchronizing signal enters from ⑪, and by the phase difference of these two in the phase detection section, a control output is obtained in ⑧ This output is given a suitable responce characteristic in the integrating circuit, and it enters ②, controlling the horizontal oscillating frequency.

The oscillating system of HA1166Y is an RC oscillation. A rectangular wave pulse in obtained from ⑫ after slicing the triangular wave. Since up to the driver stage is integrated, the output stage is immediately driven from ⑫ through the transformer.

② Horizontal output circuit

Operations of the horizontal output circuit is similar to conventional ones; however, this circuit has the following features compared with conventional ones:

1. By adopting a direct rectifying system using a silicon avalanche diode which has semipermanent durability for high-voltage rectification, power consumption is lowered and reliability is raised.
2. All noninflammable materials in wax, bobbin, enclosure, and so on for the F.B.T. and the open-type, high-voltage section are adopted, considering high reliability of the high-voltage section.
3. A silicon transistor is adopted for the output transistor which requires a high-voltage, large current; thus, the design has attained high reliability which is preferable to the former one.

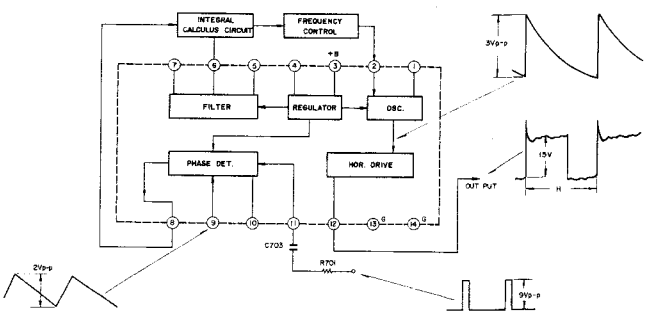


Fig. 9

GENERAL ALIGNMENT INSTRUCTIONS

1. VIDEO I-F ALIGNMENT

TEST EQUIPMENT & CONNECTION (See Fig. 10)

MARKER GENERATOR (35~50MHz) ..... Couple loosely to the out put cable of sweep genarator

SWEEP GENERATOR (35~50MHz) ..... Connect the resistor (5.6KΩ) and the capacitor (0.01μF) to the test point (TP) of tuner.

OSCILLOSCOPE ..... Connect the resistor (100KΩ) to terminal (TP201).

BIAS SUPPLY ..... Add 2~6V of AGC voltage.

STEP		SWEEP GENERATOR	MARKER GENERATOR	ADJUST	REMARKS
1.	Adjust 47.25MHz trap coil	35 ~ 50MHz	47.25MHz, 400Hz Modulation	L203	Adjust so that the signal of 400Hz in oscilloscope may be minimum.
2.	Adjust 39.75MHz trap coil	35 ~ 50MHz	39.75MHz, 400Hz Modulation	L202	Adjust so that the signal of 400Hz in oscilloscope may be minimum.
3.	Adjust 41.25MHz trap coil	35 ~ 50MHz	41.25MHz, 400Hz Modulation	L204	Adjust so that the signal of 400Hz in oscilloscope may be minimum.
4.	Adjust video IF coil	35 ~ 50MHz	44.0MHz, 400Hz Modulation	L201	Adjust so that the signal of 400Hz in oscilloscope may be maximum.
5.	Adjust video IF transformer, coil	35 ~ 50MHz	45.75MHz 42.75MHz Modulation	T201 L207	Adjust so that the signal in oscilloscope become Fig. 11
If the same characteristic as that of Fig. 11 does not appear, readjust STEP 1. ~ STEP 5.					

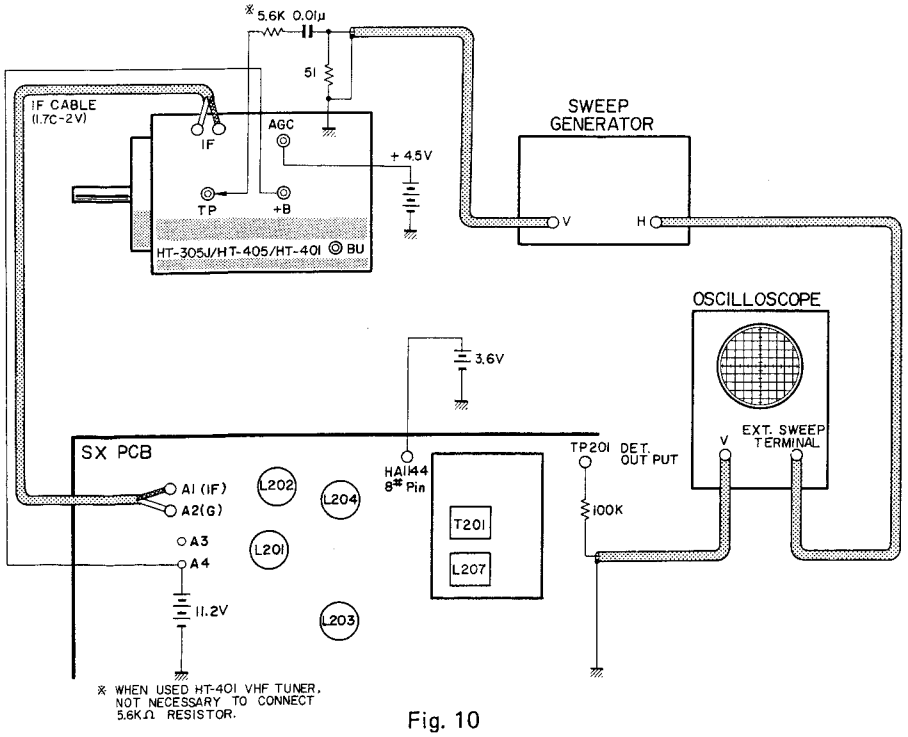


Fig. 10

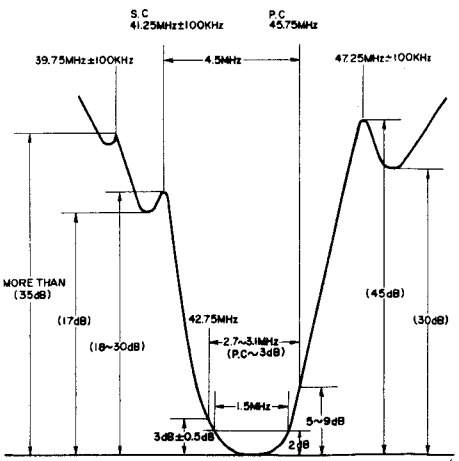


Fig. 11

2. SOUND I-F ALIGNMENT

TEST EQUIPMENT & CONNECTION (See Fig. 12)

SIGNAL GENERATOR ..... Connect capacitor (0.01μF) to the TP201.
DC VOLTMETER ..... Connect as Fig. 12.
HIGH FREQUENCY VOLTMETER ..... Connect to R510.
OSCILLOSCOPE ..... Connect to S1 terminal

STEP	TEST EQUIPMENT	ADJUST	REMARKS
1	DC V.T.V.M connect to IC3.	T401	Adjust T401 so that the indication of DC V.T.V.M may be maximum.
2.	HIGH FREQUENCY V.T.V.M connect to R510	L502	Adjust L502 so that the indication of HIGH FREQUENCY V.T.V.M may be minimum.
3.	Repeat adjustment of STEP 1.		
4.	DC V.T.V.M connect to T402 Ⓐ	T402 (PINK)	Adjust T402 (PINK) so that the indication of DC V.T.V.M may be maximum.
5.	DC V.T.V.M connect to C406 Ⓑ	T402 (BLUE)	Adjust T402 (BLUE), for exactly one-half of the previous reading.

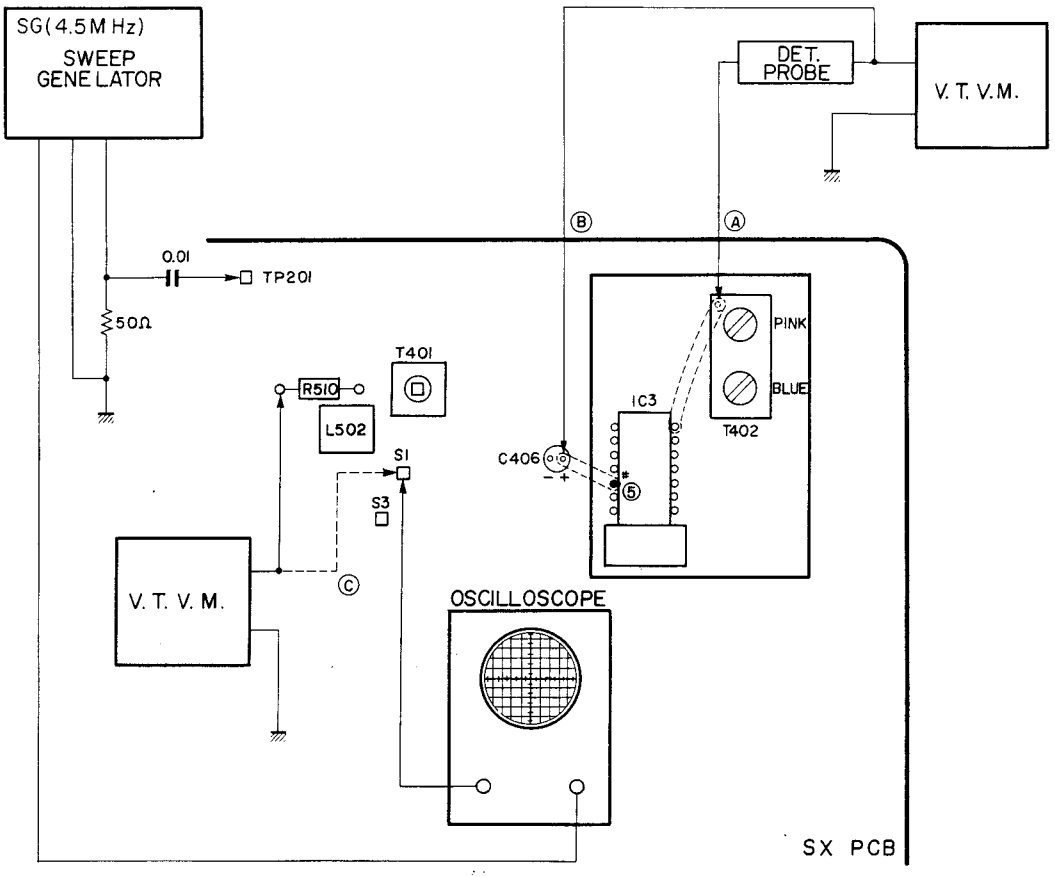


Fig. 12

3. AGC ALIGNMENT

TEST EQUIPMENT CONNECTION
DC VOLTMETER ..... Connect to the terminal A3 (Tuner AGC. terminal) and earth.

STEP		ADJUST	REMARKS
Connect the Test Pattern of 61dB to VHF antenna terminal for the alignment of R209.			
1	Adjust the AGC	R209	Adjust R209 so that the DC VOLTMETER will indicate 3.9V±0.1V

4. HORIZONTAL DEFLECTION ALIGNMENT

STEP		ADJUST	REMARKS
1	Horizontal oscillator adjustment	R709	Adjust R709 so that oscillation frequency may be 15.734KHz. To measure the frequency, see the frequency counter or picture drift.

5. VERTICAL DEFLECTION ALIGNMENT

Adjust R606 and R607 alternately so that the linearity may be optimum condition when the inside of the largest circle of test pattern reaches the edge of the picture tube.

6. POWER SOURCE ALIGNMENT

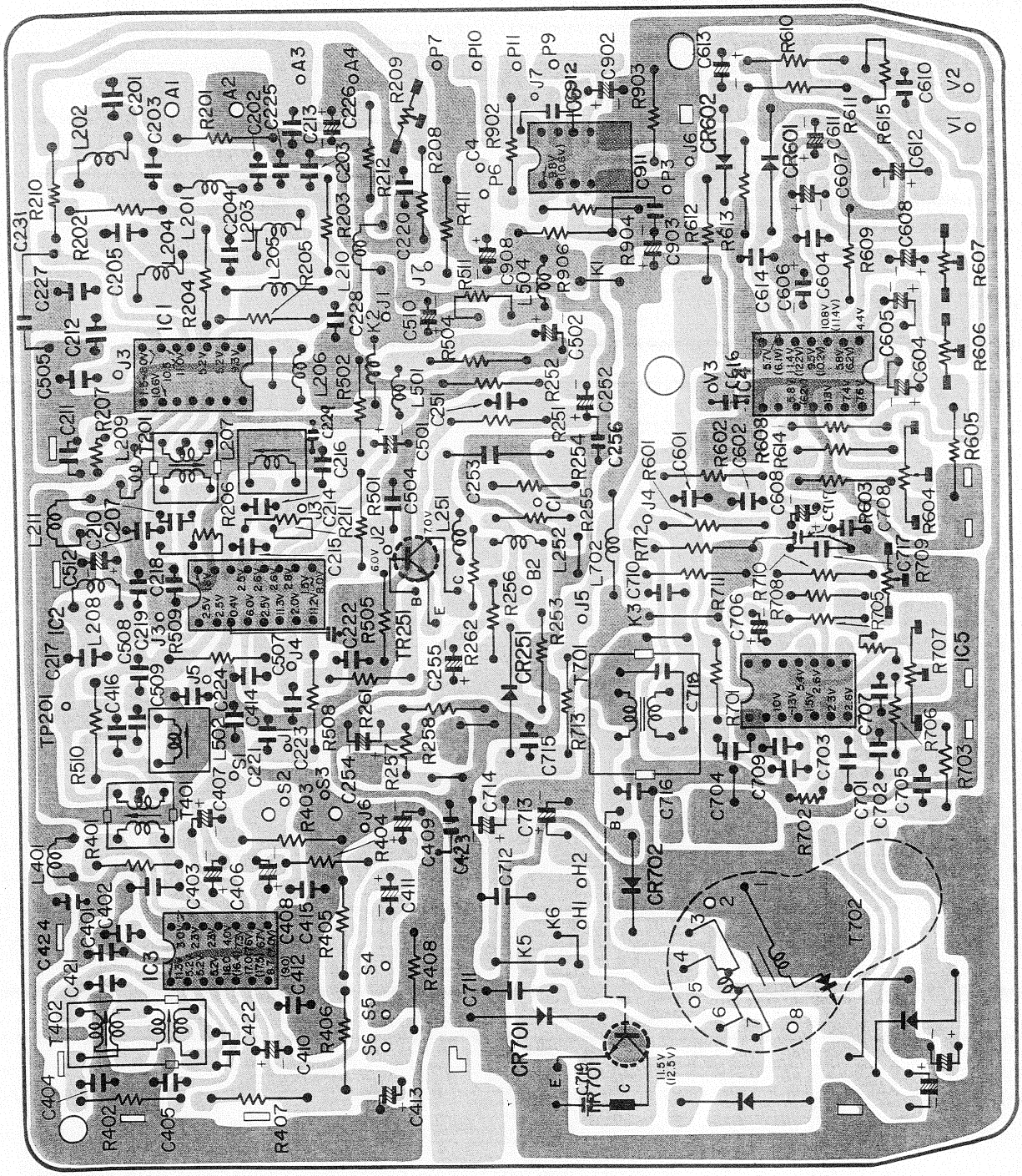
Adjust R903 so that the indication voltage of meter of P7 may be 11.4V.

PRINTED CIRCUIT BOARD
[SX TYPE]

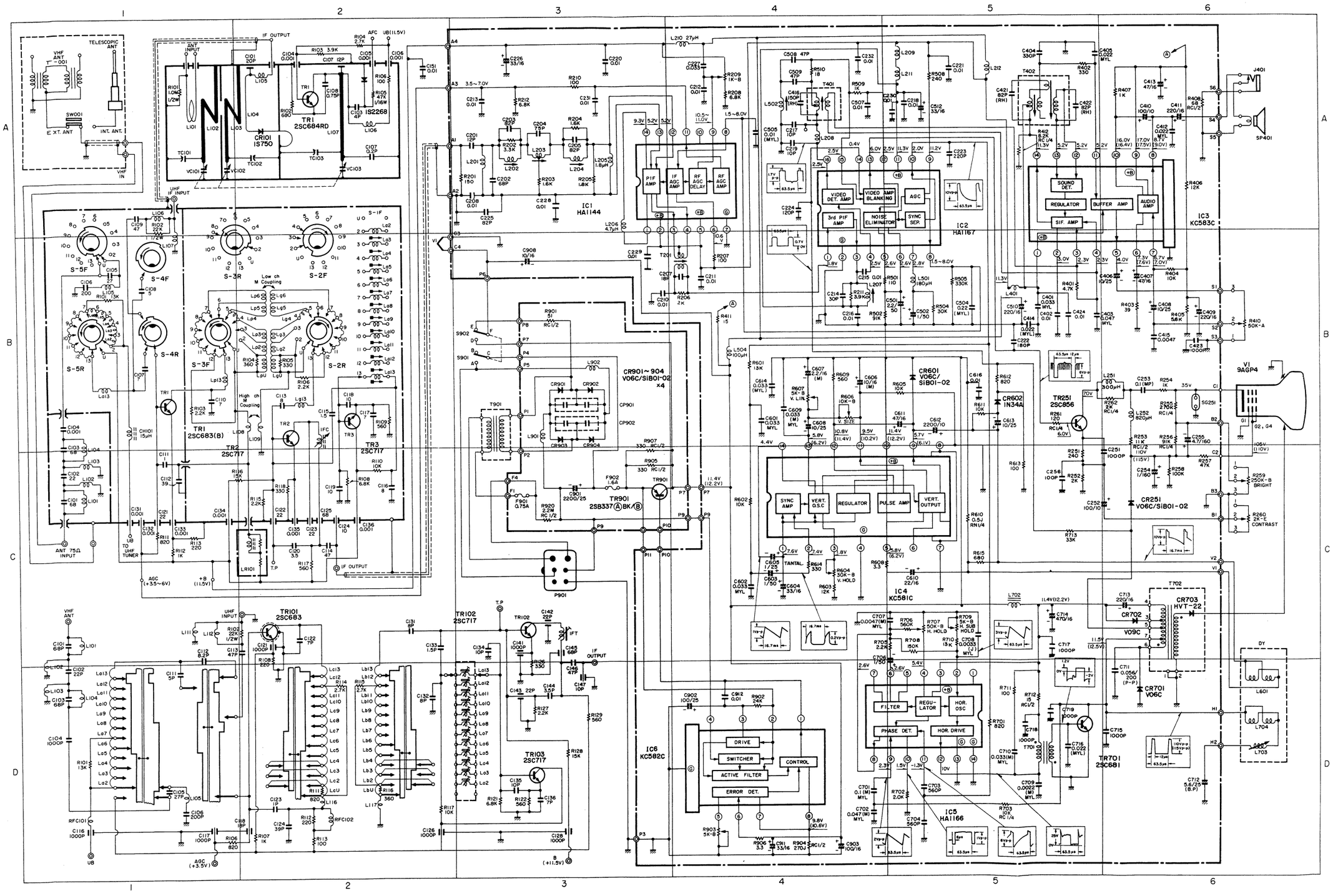
..... +B PATTERN

..... SIGNAL PATTERN

..... GROUND PATTERN



BASIC CIRCUIT SCHEMATIC DIAGRAM (I-28)



REPLACEMENT PARTS LIST

NOTE: 1. "PLACE" means the place of each part in the circuit diagram.
2. The * marked parts are newly adopted ones.

PLACE	SYM-BOL NO.	STOCK NO.	DESCRIPTION
CAPACITOR			
A3	C201	0248662	Ceramic 12pF ±5% 50WV
A3	C202	0248680	Ceramin 68pF ±5% 50WV
A3	C203	0246462	Ceramic 82pF ±5% 50WV
A3	C204	0246461	Ceramic 75pF ±5% 50WV
A3	C205	0246462	Ceramic 82pF ±5% 50WV
A3	C208	0244171	Ceramic 0.01μF +80 −20 % 50WV
B3	C210	0244171	Ceramic 0.01μF +80 −20 % 50WV
B4	C211	0244171	Ceramic 0.01μF +80 −20 % 50WV
A4	C212	0244171	Ceramic 0.01μF +80 −20 % 50WV
A3	C213	0244171	Ceramic 0.01μF +80 −20 % 50WV
B4	C214	0246451	Ceramic 30pF ±5% 50WV
B4	C215	0244171	Ceramic 0.01μF +80 −20 % 50WV
B4	C216	0244171	Ceramic 0.01μF +80 −20 % 50WV
A4	C217	0248650	Ceramic 10pF ±0.5pF 50WV
A5	C218	0244171	Ceramic 0.01μF +80 −20 % 50WV
A4	C219	0248650	Ceramic 10pF ± 0.5pF 50WV
A3	C220	0244171	Ceramic 0.01μF +80 −20 % 50WV
A5	C221	0244171	Ceramic 0.01μF +80 −20 % 50WV
B5	C222	0248690	Ceramic 180pF ± 5% 50WV
A5	C223	0248732	Ceramic 220pF ±10% 50WV
A4	C224	0248726	Ceramic 120pF ±10% 50WV
A3	C226	0252523	Electrolytic 33μF 16WV
A4	C227	0275114	Polyester film 0.033μF ±20% 50WV
A3	C228	0244171	Ceramic 0.01μF ±10% 50WV
B3	C229	0244171	Ceramic 0.01μF +80 −20 % 50WV
A5	C230	0244171	Ceramic 0.01μF +80 −20 % 50WV
C6	C251	0274011	Polyester film 1000pF ±10% 50WV
C6	C252	0252331	Electrolytic 100μF 10WV
B6	C253	0261151	Polypropylene 0.1μF ±20% 150WV
C6	C254	0257535	Electrolytic 1μF 160WV
B6	C255	0257537	Electrolytic 4.7μF 160WV
C5	C256	0248724	Ceramic 100pF ±10% 50WV
B5	C401	0275114	Ceramic 0.033μF ±20% 50WV
B5	C402	0244171	Ceramic 0.01μF +80 −20 % 50WV
B5	C403	0275015	Polyester film 0.047μF ±10% 50WV
A5	C404	0248736	Ceramic 330pF ±10% 50WV
A5	C405	0275013	Polyester film 0.022μF ±10% 50WV
B6	C406	0252621	Electrolytic 10μF 25WV
B6	C407	0252525	Electrolytic 47μF 16WV
B6	C408	0252621	Electrolytic 10μF 25WV
B6	C409	0252532	Electrolytic 220μF 16WV
A6	C410	0252331	Electrolytic 100μF 10WV
A6	C411	0252532	Electrolytic 220μF 16WV
A6	C412	0275013	Polyester film 0.022μF ±10% 50WV
A6	C413	0252525	Electrolytic 47μF 16WV
B5	C414	0275113	Polyester film 0.022μF ±20% 50WV
B6	C415	0244165	Ceramic 0.0047μF 50WV
A4	C416	0248058	Ceramic 150pF ±5% 50WV
A5	C421	0248052	Ceramic 82pF ±5% 50WV
A5	C422	0248052	Ceramic 82pF ±5% 50WV
B6	C423	0244101	Ceramic 1000pF ±10% 50WV
B5	C424	0244171	Ceramic 0.01μF +80 −20 % 50WV
B5	C501	0252817	Electrolyte 2.2μF 50WV
B5	C502	0252811	Electrolytic 1μF 50WV
B5	C504	0276113	Ceramic 0.22μF ±20% 50WV
A4	C505	0275011	Ceramic 0.01μF ±10% 50WV
A4	C507	0248734	Ceramic 270pF ±10% 50WV
A4	C508	0248716	Ceramic 47pF ±10% 50WV
A4	C509	0248716	Ceramic 47pF ±10% 50WV
B5	C510	0252532	Electrolytic 220μF 16WV
A5	C512	0252523	Electrolytic 33μF 16WV
B4	C601	0275114	Ceramic 0.033μF ±20% 50WV
C4	C602	0275114	Ceramic 0.033μF ±20% 50WV
C4	C603	0252811	Electrolytic 1μF 50WV
C4	C604	0252523	Electrolytic 33μF 16WV
C4	C605	0292706	Tantal 1μF 25WV
B4	C606	0251077	Electrolytic 10μF 16WV
B4	C607	0251073	Electrolytic 2.2μF 16WV
B4	C608	0252621	Electrolytic 10μF 25WV
B4	C609	0275114	Ceramic 0.033μF ±20% 50WV
C5	C610	0252522	Electrolytic 22μF 16WV
B5	C611	0252525	Electrolytic 47μF 16WV
B5	C612	0252337	Electrolytic 2200μ 10WV
B5	C613	0252621	Electrolytic 10μF 25WV
B4	C614	0275014	Ceramic 0.033μF ±10% 50WV
B5	C616	0244171	Ceramic 0.01μF +80 −20 % 50WV
D4	C701	0276111	Ceramic 0.1μF ±20% 50WV
D4	C702	0275115	Ceramic 0.047 ±20% 50WV
D5	C703	0244115	Ceramic 560pF ±10% 50WV
D5	C704	0244115	Ceramic 560pF ±10% 50WV
D5	C706	0252811	Electrolytic 1μF 50WV
C5	C707	0274115	Ceramic 0.0047μF±20% 50WV
C5	C708	0275024	Ceramic 0.0033μF±5% 50WV
D5	C709	0274113	Ceramic 0.0022μF±20% 50WV
D5	C710	0275114	Ceramic 0.033μF ±20% 50WV
D6	C711	0299923	Ceramic 0.056μF ±10% 200WV
D6	C712	0252655	Electrolytic 5.6μF 25WV
C6	C713	0252532	Electrolytic 220μF 16WV
C5	C714	0252565	Electrolytic 470μF 16WV
D6	C715	0244501	Ceramic 1000pF ±10% 500WV
D5	C716	0275013	Ceramic 0.022μF ±10% 50WV
C5	C717	0244101	Ceramic 1000pF ±10% 50WV
D5	C718	0244101	Ceramic 1000pF ±10% 50WV
D5	C719	0244501	Ceramic 1000pF ±10% 50WV
C3	C901	0252637	Electrolytic 2200μF 25WV
D4	C902	0252631	Electrolytic 100μF 25WV
D4	C903	0252531	Electrolytic 100μF 16WV
B3	C908	0252321	Electrolytic 10μF 10WV
D4	C911	0252523	Electrolytic 3.3μF 16WV
C4	C912	0244171	Electroltic 0.01μF 16WV
RESISTOR			
A3	R201	0114135	Carbon film 150Ω ±5% SRD¼P
A3	R202	0131679	Composition 3.3KΩ ±5% RC¼GF
A3	R203	0114166	Carbon film 1.6KΩ ±5% SRD¼P
A3	R204	0114166	Carbon film 1.6KΩ ±5% SRD¼P
A3	R205	0114167	Carbon film 1.8KΩ ±5% SRD¼P
B4	R206	0137611	Carbon film 2.7KΩ ±5% SRD¼P
B4	R207	0137551	Carbon film 100Ω ±5% SRD¼P
A4	R208	0114181	Carbon film 6.8KΩ ±5% SRD¼P
A4	R209	0151252	Control 1KΩ-B AGC
A3	R210	0114131	Carbon film 100Ω ±5% SRD¼P
B4	R211	0137615	Carbon film 3.9KΩ ±5% SRD¼P
A3	R212	0114181	Carbon film 6.8KΩ ±5% SRD¼P
C5	R251	0114140	Carbon film 240Ω ±5% SRD¼P
C5	R252	0114168	Carbon film 2KΩ ±5% SRD¼P
B6	R253	0134386	Composition 12KΩ ±10% RC½GF
B6	R254	0131667	Composition 1KΩ ±5% SRD¼P
B6	R255	0131761	Composition 270KΩ ±5% RC¼GF
B6	R256	0131732	Composition 91KΩ ±5% RC¼GF
C6	R257	0137667	Composition 47KΩ ±5% SRD¼P
C6	R258	0131751	Composition 100KΩ ±5% RC¼GF
C6	R259	0153668	Control 250KΩ-B BRIGHT
C6	R260	0153247	Control 2KΩ-E CONT.
B5	R261	0131627	Composition 120Ω ±5% RC¼GF
B6	R262	0131679	Composition 2KΩ ±5% RC¼GF
B5	R401	0131683	Composition 4.7KΩ ±5% RC¼GF
A5	R402	0114143	Carbon film 330Ω ±5% SRD¼P
B6	R403	0114055	Carbon film 39Ω ±5% SRD¼P
B6	R404	0131709	Composition 10KΩ ±5% RC¼GF
B6	R405	0114179	Carbon film 5.6KΩ ±5% SRD¼P
A6	R406	0114203	Carbon film 12KΩ ±5% SRD¼P
A6	R407	0114161	Carbon film 1KΩ ±5% SRD¼P
A6	R408	0134299	Composition 68Ω ±10% RC½GF
B6	R410	0153250	Control 50KΩ-A VOLUME
B4	R411	0114011	Carbon film 5.6Ω ±5% SRD¼P
B5	R412	0131702	Composition 8.2KΩ ±10% RC¼GF
B5	R501	0114132	Carbon film 110Ω ±5% SRD¼P
B5	R502	0114224	Carbon film 91KΩ ±5% SRD¼P
B5	R504	0114212	Carbon film 30KΩ ±5% SRD¼P
B5	R505	0114293	Carbon film 330KΩ ±5% SRD¼P
A5	R508	0114140	Carbon film 240Ω ±5% SRD¼P
A4	R509	0114161	Carbon film 1KΩ ±5% SRD¼P
A4	R510	0114047	Carbon film 18Ω ±5% SRD¼P
B4	R601	0114204	Carbon film 13KΩ ±5% SRD¼P
C4	R602	0114201	Carbon film 10KΩ ±5% SRD¼P
C4	R603	0114203	Carbon film 12KΩ ±5% SRD¼P
C4	R604	0151303	Control 30KΩ-B V.HOLD
B5	R605	0114201	Carbon film 10KΩ ±5% SRD¼P
B4	R606	0151267	Control 10KΩ-B V.SIZE
B4	R607	0151254	Control 5KΩ-B V.LIN.
C5	R608	0114005	Carbon film 3.3Ω ±5% SRD¼P
B4	R609	0114149	Carbon film 560Ω ±5% SRD¼P
C5	R610	0119504	Metal oxide film 0.5Ω ±5% RN¼
B5	R611	0114201	Carbon film 10KΩ ±5% SRD¼P
B5	R612	0114153	Carbon film 820Ω ±5% SRD¼P
C5	R613	0114131	Carbon film 100Ω ±5% SRD¼P
C4	R614	0114143	Carbon film 330Ω ±5% SRD¼P
C4	R615	0137811	Composition 680Ω ±10% SRD¼P
D6	R701	0131647	Composition 820Ω ±5% SRD¼P
D6	R702	0137608	Composition 2KΩ ±5% SRD¼P
D5	R703	0131709	Composition 10KΩ ±5% RC½GF
C5	R705	0131675	Composition 2.2KΩ ±5% SRD¼P
C5	R706	0131769	Composition 560KΩ ±5% SRD¼P
C5	R707	0153716	Control 50KΩ-B H. HOLD
C5	R708	0131755	Composition 150KΩ ±5% RC¼GF
C5	R709	0151254	Control 5KΩ-B H. SUB.
C5	R710	0114204	Carbon film 13KΩ SRD¼P
D6	R711	0114131	Carbon film 100Ω ±5% SRD¼P
D5	R712	0134291	Composition 15Ω ±10% RC½GF
C5	R713	0114213	Carbon film 33KΩ ±5% SRD¼P
B3	R901	0134033	Composition 51Ω ±5% SRD½P
D4	R902	0114210	Carbon film 24KΩ ±5% SRD¼P
D4	R903	0151085	Control 5KΩ-B +B ADJ.
D4	R904	0134051	Composition 270Ω ±5% SRD½P
C3	R905	0134053	Composition 330Ω ±5% RC½GF
D4	R906	0114005	Carbon film 3.3Ω ±5% SRD¼P
C3	R907	0134053	Composition 330Ω ±5% RC½GF
C3	R920	0134428	Composition 2.2MΩ ±10% SRD½P
SEMICONDUCTOR			
B5	TR251	2320051	Silicon 2SC856
D5	TR701	2321121	Selicon 2SC681
C3	TR901	2320541	Germanium 2SB337 Ⓐ
A4	IC 1	2360151	HA1144
A4	IC 2	2360261	HA1167
A6	IC 3	2360291	KC583C
C4	IC 4	2360271	KC581C
D5	IC 5	2360252	HA1166Y
D4	IC 6	2360281	KC582C
C6	CR251	2331121	Silicon SIB01-02
B5	CR601	2331121	Silicon SIB01-02
B5	CR602	0575001	Germanium 1N34A
D6	CR701	2330251	Silicon VO6C
C6	CR702	2330551	Silicon VO9C
B3	CR901	2331121	Silicon SIB01-02
B3	CR902	2331121	Silicon SIB01-02
B3	CR903	2331121	Silicon SIB01-02
B3	CR904	2331121	Silicon SIB01-02
COIL			
A3	L201	2140881	IFT
A3	L202	2140888	IFT
A3	L203	2141453	IFT
A3	L204	2140881	IFT
A3	L205	2121304	Peaking coil 1.8μH
A3	L206	2121439	Peaking coil 4.7μH
B4	L207	2121171	IF coil
A4	L208	2120467	Filter coil
A5	L209	2121203	Filter coil
A4	L210	2121449	Peaking coil 27μH
A5	L211	2121175	Filter coil
A5	L212	2120079	Peaking coil 5.6μH
B6	L251	2120257	Peaking coil 300μH
B6	L252	2120269	Peaking coil 820μH
B5	L401	2121175	Filter coil
B5	L501	2120252	Peaking coil 180μH
A4	L502	2120194	Trap coil 4.5MHz

PLACE	SYM-BOL NO.	STOCK NO.	DESCRIPTION
C5	L702	2120041	Filter coil
B3	L901	2120331	Filter coil
B3	L902	2120331	Filter coil
			TRANSFORMER
B4	T201	2141392	IFT
A4	T401	2141361	IFT
A5	T402	2141372	Discriminater transformer
D5	T701	2270402	Horizontal drive
C6	T702	2430951	F.B.T
B3	T901	2210548	Power transformer
B3	CP901	2790083	Compound component
B3	CP902	2790083	Compound component
			MISCELLANEOUS
		2750091	Antenna-Telescopic antenna
		2750051	Antenna-Loop antenna
		2682461	Antenna terminal board
*		3215831	Cover assembly (BEIGE)
*		3215832	Cover assembly (RED)
*		3215833	Cover assembly (LIGHT BLUE)
*		2440604	Deflection yoke
		2730062	Earphone
		2670531	Earphone jack
*		3190561	Front filter assembly
*		3215821	Front frame assembly (BEIGE)
*		3215822	Front frame assembly (RED)
*		3215823	Front frame assembly (LIGHT BLUE)
	F901	2720052	Fuse 0.75A
	F902	0591207	Fuse 1.6A
*		3256301	Knob-VHF channel
*		3256302	Knob-UHF channel
*		3252372	Knob-Pre-set tuning
*		3730151	Knob-Volume
		3252324	Knob-Contrast, Brightness
		3255941	Knob-UHF pre-set tuning
		2740703	Power cord
	SG251	2340031	Spark gap
*		2503671	SX P.C.B assembly
		2410481	Speaker 8cm
*		2650574	Socket-C.P.T socket
		2420616	Tuner-VHF tuner HT-305J
		2421531	Tuner-UHF tuner HU-354
		2350224	Tube-C.P.T 9AGP4

PLACE	SYM-BOL NO.	STOCK NO.	DESCRIPTION

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Printed in Japan NS-R (H)